

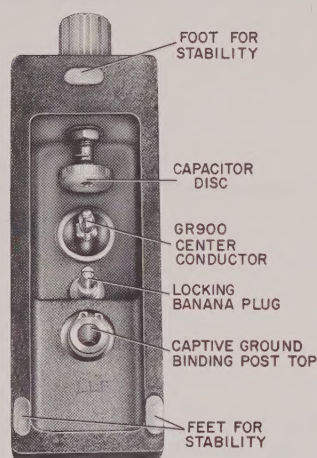


Type 1615-P2 COAXIAL ADAPTOR

Figure 1. Type 1615-P2 Coaxial Adaptor.



Figure 2. Interior view of Type 1615-P2.



SPECIFICATIONS

Capacitance Range When Mounted on Type 1615 Terminals:

Maximum: ≥ 5.6 pF

Minimum: ≤ 5.2 pF

Fringing Capacitance

With Open GR900 Connector:

0.155 pF ± 0.008 pF

With GR900-WO:

0.172 pF ± 0.008 pF

Inductance: 25 nH (typical)

Mechanical Data

Width		Height		Depth		Net Weight		Shipping Weight	
in	mm	in	mm	in	mm	oz	kg	lbs	kg
1-3/4	44.5	5-5/16	135	3	76.2	13	.370	2-1/2	1.1

SECTION 1

INTRODUCTION

1.1 DESCRIPTION.

CAUTION

The contact surfaces of the outer conductors must be protected, as nicks or dents can impair electrical performance.

The Type 1615-P2 Coaxial Adaptor, Figures 1 and 2, provides a connection between the UNKNOWN

binding posts of the GR Type 1615 Capacitance Bridge and the GR900 Precision Coaxial Connectors.

The adaptor has a sturdy cast-aluminum housing. It is held firmly in place on the bridge panel by means of the binding posts, to prevent any shifts in capacitance while measurements are being made.

An adjustment is provided that makes it possible to balance out the adaptor capacitance, the capacitance between the bridge binding posts, and the fringing capacitance on all but the two highest ranges of the

bridge. This means that the capacitance being measured can be read directly without calculations to correct for the stray capacitance. On the two highest ranges of the bridge, the stray capacitance may be adjusted to a value that permits easy mental calculations for correction.

SECTION 2

OPERATING PROCEDURE

2.1 INSTALLATION.

To mount the Type 1615-P2 on the Type 1615:

- a. Remove the top from the UNKNOWN GND binding post on the Type 1615.
- b. Tighten the tops on the H and L binding posts securely.
- c. Turn the screw in the locking banana plug to the extreme counter-clockwise position (Figure 1).
- d. Place the Type 1615-P2 on the UNKNOWN bridge terminals with the GR900 Connector over the H terminal and the captive binding post top on the GND terminal of the bridge. (See Figure 2 for bottom view of connectors.)
- e. Press the adaptor firmly against the bridge panel and tighten the top on the GND post securely.
- f. Tighten the screw in the locking banana plug firmly.

2.2 BALANCING STRAYS.

2.2.1 10-pF, 100-pF, 1000-pF, AND 0.01- μ F C MAX RANGES.

To use the 10-pF, 100-pF, 1000-pF, or 0.01- μ F C MAX range:

- a. Turn the Terminal Selector switch to the 2-TERMINAL position on the Type 1615.
- b. Turn the MULTIPLY EXT STANDARD switch on the Type 1615 to 10 for 10-pF, 100-pF, or 1000-pF. Turn the switch to 1 for 0.01- μ F.

2.2.1.1 Reference Plane Measurements.

For measurements at the reference plane of the GR900 connector, turn the locking nut to the storage position (paragraph 2.3) and set the bridge to the nominal value of fringing capacitance (0.155-pF) of the GR900 connector. Balance the bridge with the ZERO ADJUSTER knob on the adaptor.

The fringing capacitance of the open GR900 connector is not affected significantly by conductors that are a foot or more away from it. If desired, the effect of nearby conductors may be eliminated completely by using a GR900-WO Open Circuit Termination as a cap for the open connector. In this case, the

1.2 USES.

By using the Type 1615-P2 Coaxial Adaptor on a Type 1615 Capacitance Bridge or a Type 1620 Capacitance Measuring Assembly, precision two-terminal low-frequency measurements can be made on standards and components having GR900 Precision Coaxial Connectors for terminals. This is particularly useful on coaxial capacitance standards such as the GR Type 1406 Coaxial Capacitance Standards.

bridge should be set to 0.172 pF which is the nominal value of the fringing capacitance.

2.2.1.2 Better Accuracy.

Better accuracy can be obtained if a small capacitor with GR900 connectors for terminals is available whose capacitance at the connector reference plane is known more accurately than ± 0.008 -pF. Connect the capacitor to the adaptor, set the bridge to the value of the capacitor, and balance with the ZERO ADJUSTER.

2.2.1.3 No Fringing Capacitance Correction.

To measure capacitance without correcting for the fringing capacitance at the reference plane of the adaptor, set the bridge to zero, with the connector open, and balance with the ZERO ADJUSTER.

2.2.2 0.1- μ F AND 1- μ F C MAX RANGES.

To use the 0.1- μ F or 1- μ F C MAX range:

- a. Turn the MULTIPLY EXT STANDARD switch to zero.
- b. Set the bridge reading to 5.2 pF or 5 pF respectively.
- c. Balance the bridge with the ZERO ADJUSTER on the adaptor.
- d. Correct capacitance is found by subtracting 5 pF from the reading of the bridge.

2.3 MATING OF GR900 CONNECTORS.

Since only one locking nut may be used, one nut must be placed in the storage position.

a. To store the locking nut, slide it back until the threads engage. Then thread it back off the centering gear ring and slide it to the ridge at the rear of the coupling nut.

b. Move the locking nut of the other connector back. Align the connectors axially and engage the teeth of the centering gear rings in any convenient orientation.

c. Hold the connectors in the joined position, thread the active locking nut over the centering gear ring of the mating connector, and hand tighten.

SECTION 3

PRINCIPLES OF OPERATION

3.1 GR900 PRECISION COAXIAL CONNECTOR.

The GR900 connector used on this adaptor is of the proven 14 millimeter design. In a connector of this design, repeatability and precision are a primary design requirement. The extremely reliable repeatability of this connector is realized by the use of various highgrade materials and finishes. Precision is derived from the extremely close tolerances held when the connector parts are machined.

When two GR900 connectors are mated, the centering gear rings interlock and overlap to center the connectors with respect to each other. The front surfaces of the outer conductors butt firmly together under the pressure of the locking nut and the inner-conductor connection is made by a spring-contact assembly which is depressed when two connectors are mated. This spring-contact assembly has six independently sprung segments which produce a wiping contact when mated with another spring-contact assembly or a flat surface.

The basic GR900 connector construction was designed for good repeatability at microwave frequencies. The GR900 connector used on this adaptor has good repeatability at high frequencies and therefore, performs extremely well when used at the audio frequencies on the Type 1615 Capacitance Bridge to calibrate capacitors that can be used as standards throughout the audio and rf ranges.

3.2 FRINGING CAPACITANCE.

An open GR900 connector has a fringing capacitance (C_f , Figure 3) consisting of the total stray capacitance outside the reference plane. When a capacitor with a GR900 connector for terminals is added (Figure 4), the fringing capacitance (C_f) is eliminated, and the net increase in capacitance equals the value of the capacitor, measured at its reference plane, minus the value of the fringing capacitance. However, if the bridge is set at the value of this fringing capacitance (C_f) when the internal capacitance of the bridge and adaptor are balanced as in paragraph 2.2.1.1, the value of the fringing capacitance is eliminated from the calculations and the capacitance value read on the bridge is the value of the capacitor being measured.

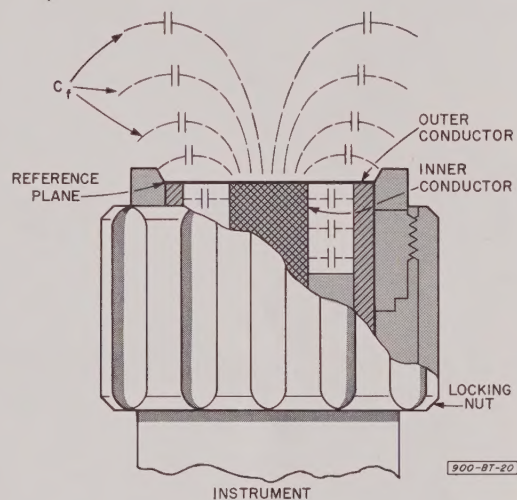


Figure 3. Precision coaxial connector in open-circuit configuration showing fringing capacitance.

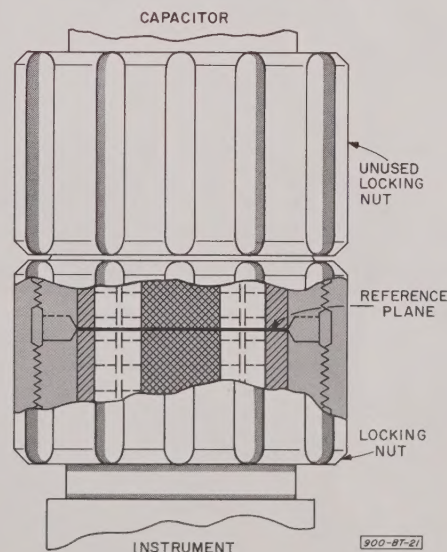


Figure 4. Precision coaxial connector in mated pair configuration.

SECTION 4

SERVICE AND MAINTENANCE

4.1 WARRANTY.

We warrant that each new instrument manufactured and sold by us is free from defects in material and workmanship, and that, properly used, it will perform in full accordance with applicable specifications for a period of two years after original shipment. Any instrument or component that is found within the two-year period not to meet these standards after examination by our factory, Sales Engineering office, or authorized repair agency personnel, will be repaired, or at our option, replaced without charge, except for tubes or batteries that have given normal service.

4.2 SERVICE.

The two-year warranty stated above attests the quality of materials and workmanship in our products. When difficulties do occur, our service engineers will assist in any way possible. If the difficulty cannot be eliminated by use of the following service instruction, please write or phone our Service Department (see panel below), giving full information of the trouble and of steps taken to remedy it. Be sure to mention the serial, type, and ID numbers of the instrument.

Before returning an instrument to General Radio for service, please write to our Service Department or nearest Sales Engineering office, requesting a Returned Material Tag. Use of this tag will ensure proper handling and identification. For instruments not covered by the warranty, a purchase order should be forwarded to avoid unnecessary delay.

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